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EXAMINER

PROCTOR, JASON SCOTT

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 03/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/025,414

Applicant(s)

TSAI ET AL.

Examiner

Jason Proctor

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/22/02, 12/11/02</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claims 1-20 have been submitted for examination.

Claims 1-20 have been rejected.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1-6 and 17-20 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Examiner understands Applicant's invention as a database interface to data that results from an inventive simulation, however the disclosure does not contain an enabling description of this simulation. From the specification (page 2, paragraph 0005) it appears that Applicant's invention reduces the work of producing simulation data from 12-24 hours per revision to presumably 12-24 hours total. The results of this inventive simulation are what allow the database interface to provide data relating to a changed set of simulation parameters, however the simulation itself is not disclosed. The simulation that produces data for parameters that are unknown or unspecified at the time of simulation is not enabled by the disclosure. Particularly lacking are the process

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by which the inventive simulation operates, the form taken by the simulation results, and how the database interface relates specified simulation parameters to the simulation data.

The Examiner has considered the Information Disclosure Statements submitted by the Applicant, however the art cited teaches that a simulation of various integrated circuit manufacturing processes can be performed. This is NOT the basis for this 35 U.S.C. § 112, first paragraph rejection. To reiterate, the inventions of claim 1-6 and 17-20 involve a simulation that apparently produces data for parameters that are unknown or unspecified at the time of simulation. A person of ordinary skill in the art at the time of Applicant's invention would not know how to make and use the invention as disclosed.

The Examiner respectfully requests disclosure of what Applicant regards as the state of the art in relation to the simulation of the instant application. References to patent applications, issued patents, or submission of non-patent literature that teach a simulation suitable for use in the instant invention would be beneficial.

2. Claims 6 and 16 are further rejected for lack of enablement. Representative claim 6 appears to claim that simulation parameters (providing at least one new rule) can be changed and new data can be added to the database without performing an additional simulation. Claim 1 recites that the database is populated by data generated from a simulation. The Examiner respectfully requests that Applicant indicate what part of the disclosure enables the limitations of claim 6, specifically in regard to changing the

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simulation parameters, producing new data for the database, but without performing a new simulation. Claim 16, depending from claim 11, shares this deficiency.

3. Claims 7-16 are rejected under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for reporting results of simulating *integrated circuit layouts*, does not reasonably provide enablement for the broader concept of *layouts*. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The language of claims 7-16 does not limit the claimed invention to *integrated circuit layouts*, but rather to *layouts*, a term that covers anything from furniture arrangement to factory production line design. The intended uses covered by the broader term *layout* each have their own particular nuances and considerations. None of these uses are taught by the disclosure except for *integrated circuit layout*.

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4, 5, 7, 14, 15, and 20 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 4 recites the limitation "the certain information" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 4 recites provides further limitations to the step of “extracting specific information from the database” of claim 1. It is unclear whether the temporary table recited by claim 4 reside within the database or is external to the database.

7. Claim 4 recites “extracting specific information includes creating a temporary table for the certain information” but offers no explanation of what constitutes “certain information”. The claim does not specifically recite storing the “certain information” in the temporary table; therefore it is unclear what the function of the temporary table is. Neither this claim nor any claim dependent from it appears to make use of the “certain information” or the temporary table; therefore it is unclear what the claim limitation, in whole or in part, is intended to cover.

8. Claim 14 does not recite “the certain information”, however it does exhibit the remaining deficiencies of claim 4. It is unclear if the user-specified information is stored in the temporary table, and it is unclear what function the claim limitation, in whole or in part, is intended to cover.

9. Claim 20 exhibits deficiencies similar to those of claim 4.

10. Claim 5 recites the limitation “GDS mode” which renders the claim vague and indefinite. The first use of this acronym must be accompanied by its definition.

11. Claim 15 also recites the limitation “GDS mode”.

12. Claim 7 recites the database comprising, among other elements, “designated information regarding the plurality of control points” which renders the claim vague and

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indefinite. It is unknown how to differentiate "designated information" from information that has not been designated. It is unclear what "designated information" actually comprises.

Claim Interpretation

In the interest of compact prosecution, examiner makes the following claim interpretations in order to apply prior art to the claims. See *Ex parte Ionescu*, 222 USPQ 537 (Bd. Pat. App. & Inter. 1984).

13. The limitations of claim 4, are interpreted as "wherein extracting specific information includes storing data in temporary data storage."

14. Claims 14 and 20 are interpreted similarly to claim 4.

15. The limitations of claims 5 and 15 are interpreted including "and a Graphics Data Syntax (GDS) mode."

16. The limitations of claim 7 are interpreted including "information regarding the plurality of control points". This interpretation does not refer to "designated information".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 1-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang et al. US Patent No. 6,757,645 (Chang) in view of Cox et al. US Patent No. 6,263,301 (Cox).

18. Regarding claim 1, Chang teaches a method of generating reports regarding an integrated circuit layout including an image simulator that produces a simulated image of the wafer exposure which the defect area of a physical mask would generate if it were used (column 11, line 58 – column 12, line 38). This simulation is particularly concerned with the circuit layout (column 11, line 66 – column 12, line 4) and therefore respects the geometry of the circuit layout. Parameters such as “critical dimensions of the design” (column 12, lines 3-4) are specific references to what Applicant refers to as “control points”. Chang further teaches that the simulation takes into account a range of parameter values so that the results can be analyzed over a range of possible lithography conditions (column 12, lines 4-10). The process parameters can therefore be adjusted, providing a “second set of checking parameters”, and the results are immediately known without repeating the entire simulation process.

Chang does not explicitly teach storing the results of the simulation in a database or a database interface by which a user may query for the simulation results.

Cox teaches a simulations results database for managing the results of a simulation where data is delivered via transactions (column 2, lines 44-57). The simulation results stored in the database can be displayed in relation to the “transaction specific data elements”, equivalent in this context to “checking parameters” (column 3,

lines 48-60). Cox also teaches that a simulation results database facilitates the analysis of large volumes of data (column 2, lines 38-41).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to combine the pre-computed simulation results of Chang with the simulation results database of Cox to better facilitate the analysis of the large volumes of data undoubtedly produced in the act of pre-computing simulation results for the layout of an integrated circuit. The combination could be achieved by appropriately organizing the simulation results from Chang's simulation, storing the data in a database as taught by Cox, and providing an interface to the database as taught by Cox.

19. Regarding claim 2, Chang teaches that the simulation considers numerous tolerances, such as the defocus of the exposure and critical dimensions of the design, among others (column 11, lines 62 – column 12, line 4).

20. Regarding claim 3, Chang teaches organizing the data into two-dimensional graphs, which constitute a statistics table (Fig. 19 and related portions of the disclosure). Cox teaches arranging the simulation results in a register display, functionally equivalent to a table (column 4, lines 19-31; Fig. 6).

21. Regarding claim 4, official notice is taken that creating temporary data storage is a well-known technique in the computer programming arts. Therefore it would have

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been obvious to a person of ordinary skill at the time of Applicant's invention to create temporary data storage as known in the art as necessary to achieve the desired functionality of the invention.

22. Regarding claim 5, Chang teaches viewing specific information in a view by area mode (column 11, line 58 – column 12, line 10; Figs. 13-19).

23. Regarding claim 6, Chang teaches that parameters can be changed so that simulation data can be analyzed over a range of values. It would be obvious to a person of ordinary skill in the art to repeat the process of simulation if the original parameters are unacceptable. As in the combination used in the rejection of claim 1, the simulation data generated using the new parameters could be stored in a simulation results database.

24. Regarding claim 7, Chang teaches a method of generating reports regarding an integrated circuit layout including an image simulator that produces a simulated image of the wafer exposure which the defect area of a physical mask would generate if it were used (column 11, line 58 – column 12, line 38). This simulation is particularly concerned with the circuit layout (column 11, line 66 – column 12, line 4) and therefore respects the geometry of the circuit layout. Parameters such as “critical dimensions of the design” (column 12, lines 3-4) are specific references to what Applicant refers to as “control points” and are necessarily related to designated information, such as critical

dimensions. Chang further teaches that the simulation takes into account a range of parameter values so that the results can be analyzed over a range of possible lithography conditions (column 12, lines 4-10). The process parameters can therefore be adjusted, providing a "second set of checking parameters", and the results are immediately known without repeating the entire simulation process. Chang teaches performing a defect analysis which indicates the impact of a defect on the performance of an integrated circuit, which constitutes representing a magnitude of a deviation.

Chang does not explicitly teach storing the results of the simulation in a database or a database interface by which a user may query for the simulation results.

Cox teaches a simulations results database for managing the results of a simulation where data is delivered via transactions (column 2, lines 44-57). The simulation results stored in the database can be displayed in relation to the "transaction specific data elements", equivalent in this context to "checking parameters" (column 3, lines 48-60). Cox also teaches that a simulation results database facilitates the analysis of large volumes of data (column 2, lines 38-41).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to combine the pre-computed simulation results of Chang with the simulation results database of Cox to better facilitate the analysis of the large volumes of data undoubtedly produced in the act of pre-computing simulation results for the layout of an integrated circuit. The combination could be achieved by appropriately organizing the simulation results from Chang's simulation, storing the data in a

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database as taught by Cox, and providing an interface to the database as taught by Cox.

25. Regarding claim 8, Chang teaches that the simulation is particularly concerned with the circuit layout (column 11, line 66 – column 12, line 4) and therefore respects the geometry of the circuit layout. Parameters such as “critical dimensions of the design” (column 12, lines 3-4) are specific references to what Applicant refers to as “control points” and are necessarily related to layout dimensions, such as spacing related to an edge of the layout.

26. Regarding claim 9, Chang teaches that the simulation considers numerous tolerances, such as the defocus of the exposure and critical dimensions of the design, among others (column 11, lines 62 – column 12, line 4).

27. Regarding claim 10, Chang teaches organizing the data into two-dimensional graphs, which constitute a statistics table (Fig. 19 and related portions of the disclosure). Cox teaches arranging the simulation results in a register display, functionally equivalent to a table (column 4, lines 19-31; Fig. 6).

28. Claims 11-16 are broader recitations of methods that correspond to the methods of claims 1-6 and are rejected for the reasons given above regarding claims 1-6.

29. Claims 17-20 recite an apparatus for performing the methods of claims 1-4. The combinations formed in the rejections of claims 1-4 above constitute an apparatus. Therefore claims 17-20 are rejected for the reasons given above regarding claims 1-4.

Conclusion

Art considered pertinent by the examiner but not applied has been cited on form PTO-892. Specifically, a significant number of patent applications and issued patents commonly assigned to the instant application have been revealed when conducting a search of the prior art. Applicant may find it beneficial to offer an explanation regarding the patentable distinctions of the instant application over the commonly assigned patent applications and issued patents the Examiner has cited as well as those of which Applicant is aware but have not been cited.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Proctor whose telephone number is (571) 272-3713. The examiner can normally be reached on 8:30 am-4:30 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J Teska can be reached on (571) 272-3716. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

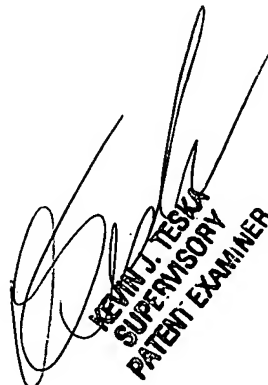
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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